

### Claims

What is claimed is:

1. A medical shoe for use in supporting a patient's foot comprising:
  - an out sole;
  - an upper assembly secured to and partially surrounded by the out sole;
  - an insole assembly substantially enclosed by the out sole and the upper assembly;
  - the out sole having a base portion generally corresponding with the plantar aspect of a human foot and of varying thickness and having a substantially rectangular opening in a top surface thereof adapted for accommodating a metatarsal shank;
  - the out sole having a circumferential counter portion extending upward circumferentially from the top surface of the base portion of the out sole around the base portion of the out sole thereby providing a cavity in the out sole;
  - the upper assembly including a heel portion, an intermediate portion and a toe portion, the heel section and intermediate section integrally connected;
  - the upper assembly adapted to surround at least the heel, sides and dorsal portions of the human foot;
  - the upper assembly attached to the top surface of the base portion of the out sole and the circumferential counter of the out sole, and extending in a dorsal direction from the top surface of the base portion of the out sole along the circumferential counter;

the insole assembly having a plurality of insole layers disposed in the out sole cavity and surrounded by the upper assembly and the out sole circumferential counter;

the plurality of insole layers provided to include at least one of a plurality of differing insole layer thickness, materials, hardnesses and densities.

2. The medical shoe as claimed in claim 1, wherein the insole assembly includes at least a first and a second insole layer wherein the first and second layers are an Ethyl Vinyl Acetate (EVA) material, and the second layer has a durometer less than the first layer.

3. The medical shoe as claimed in claim 2, wherein the insole assembly includes the first and second insole layers, and a third and a fourth insole layer wherein the third layer is a Poron material with a durometer less than the second layer and the fourth layer is an EVA material with a durometer less than the third layer; and

wherein the first, second, third, and fourth layers may be assembled in any order as determined by a health care professional.

4. The medical shoe as claimed in claim 1, wherein the opening for the metatarsal shank is centered laterally and extends distally from a location substantially corresponding to the distal 1/3 of the metatarsals in a plantar aspect of a corresponding foot to be supported by the medical shoe, and wherein the metatarsal shank accommodated therein is comprised of one of a metallic material and a rigid plastic material.

5. The medical shoe as claimed in claim 2, wherein the opening for the metatarsal shank is centered laterally and extends distally from a location substantially corresponding to the distal 1/3 of the metatarsals in a plantar aspect of a corresponding foot to be supported by the medical shoe; and

wherein the metatarsal shank accommodated therein is comprised of one of a metallic material and a rigid plastic material.

6. The medical shoe as claimed in claim 3, wherein the opening for the metatarsal shank is centered laterally and extends distally from a location substantially corresponding to the distal 1/3 of the metatarsals in a plantar aspect of a corresponding foot to be supported by the medical shoe; and wherein the metatarsal shank accommodated therein is comprised of one of a metallic material and a rigid plastic material.

7. The medical shoe as claimed in claim 4, wherein a bottom surface of the base portion of the out sole has a unique rocker shape, a rocker bottom, adapted to permit easy ambulation while also providing a stable platform for standing;

the rocker bottom having a flat mid-section in upwardly and rearwardly oblique relation to a tapered heel section and upwardly and forwardly oblique relation to a tapered toe section.

8. The medical shoe as claimed in claim 5, wherein a bottom surface of the base portion of the out sole has a unique rocker shape, a rocker bottom, adapted to permit easy ambulation while also providing a stable platform for standing;

the rocker bottom having a flat mid-section in upwardly and rearwardly oblique relation to a tapered heel section and upwardly and forwardly oblique relation to a tapered toe section.

9. The medical shoe as claimed in claim 6, wherein a bottom surface of the base portion of the out sole has a unique rocker shape, a rocker bottom, adapted to permit easy ambulation while also providing a stable platform for standing;

the rocker bottom having a flat mid-section in upwardly and rearwardly oblique relation to a tapered heel section and upwardly and forwardly oblique relation to a tapered toe section.

10. The medical shoe as claimed in claim 7, wherein the apex of the rocker bottom which is adapted to form the oblique angle between the mid-section and the tapered toe section is located just below a fitting marker just proximal to the metatarsal heads, the oblique angle between the tapered heel section and the mid-section is located just below mid-heel, and the taper of the heel section is adapted so as to cause the heel to strike at the oblique angle between the tapered heel section and the mid-section.

11. The medical shoe as claimed in claim 8, wherein the apex of the rocker bottom which is adapted to form the oblique angle between the mid-section and the tapered toe section is located just below a fitting marker just proximal to the metatarsal heads, the oblique angle between the tapered heel section and the mid-section is located just below mid-heel, and the taper of the heel section is adapted so as to cause the heel to strike at the oblique angle between the tapered heel section and the mid-section.

12. The medical shoe as claimed in claim 9, wherein the apex of the rocker bottom which is adapted to form the oblique angle between the mid-section and the tapered toe section is located just below a fitting marker just proximal to the metatarsal heads, the oblique angle between the tapered heel section and the mid-section is located just below mid-heel, and the taper of the heel section is adapted so as to cause the heel to strike at the oblique angle between the tapered heel section and the mid-section.

13. The medical shoe as claimed in claim 3, wherein the toe portion of the upper assembly is comprised of one of an open toe portion and a closed toe portion, the closed toe portion adapted to surround the metatarsal and

phalangel portions of the human foot and attached to the base portion and circumferential counter of the out sole in the same manner as the heel portion and intermediate portion of the upper assembly.

14. The medical shoe as claimed in claim 6, wherein the toe portion of the upper assembly is comprised of one of an open toe portion and a closed toe portion, the closed toe portion adapted to surround the metatarsal and phalangel portions of the human foot and attached to the base portion and circumferential counter of the out sole in the same manner as the heel portion and intermediate portion of the upper assembly.

15. The medical shoe as claimed in claim 12, wherein the toe portion of the upper assembly is comprised of one of an open toe portion and a closed toe portion, the closed toe portion adapted to surround the metatarsal and phalangel portions of the human foot and attached to the base portion and circumferential counter of the out sole in the same manner as the heel portion and intermediate portion of the upper assembly.

16. The medical shoe as claimed in claim 13, wherein the intermediate portion of the upper assembly includes inner and outer intermediate flaps adapted to cover the dorsal portion of the human foot, and connection means for interconnecting the inner and outer intermediate flaps.

17. The medical shoe as claimed in claim 14, wherein the intermediate portion of the upper assembly includes inner and outer intermediate flaps adapted to cover the dorsal portion of the human foot, and connection means for interconnecting the inner and outer intermediate flaps.

18. The medical shoe as claimed in claim 15, wherein the intermediate portion of the upper assembly includes inner and outer intermediate flaps adapted to cover the dorsal portion of the human foot, and connection means for interconnecting the inner and outer intermediate flaps.

19. The medical shoe as claimed in claim 16, wherein the connection means is comprised of one of buttons and button holes, snaps, hook and loop fastener patches, and holes with corresponding laces.

20. The medical shoe as claimed in claim 17, wherein the connection means is comprised of one of buttons and button holes, snaps, hook and loop fastener patches, and holes with corresponding laces.

21. The medical shoe as claimed in claim 18, wherein the connection means is comprised of one of buttons and button holes, snaps, hook and loop fastener patches, and holes with corresponding laces.

22. The medical shoe as claimed in claim 19, wherein the connection means is comprised of straps included a first and a second strap, each of the inner and outer flaps including a first and a second ring attached to the respective flap with each first and second ring aligned transversely with one another, and the first and second straps are provided threaded between each of the first and second rings respectively to interconnect the flaps by a pressing and a tension force;

the straps comprising one of fastening mechanisms of hook and loop fasteners, button fasteners and snap fasteners.

23. The medical shoe as claimed in claim 20, wherein the connection means is comprised of straps included a first and a second strap, each of the inner and outer flaps including a first and a second ring attached to the respective flap with each first and second ring aligned transversely with one another, and the first and second straps are provided threaded between each of the first and second rings respectively to interconnect the flaps by a pressing and a tension force;

the straps comprising one of fastening mechanisms of hook and loop fasteners, button fasteners and snap fasteners.

24. The medical shoe as claimed in claim 21, wherein the connection means is comprised of straps included a first and a second strap, each of the inner and outer flaps including a first and a second ring attached to the respective flap with each first and second ring aligned transversely with one another, and the first and second straps are provided threaded between each of the first and second rings respectively to interconnect the flaps by a pressing and a tension force;

the straps comprising one of fastening mechanisms of hook and loop fasteners, button fasteners and snap fasteners.

25. A medical shoe for use in supporting a patient's foot comprising:

an out sole;

an upper assembly secured to and partially surrounded by the out sole;

an insole assembly substantially enclosed by the out sole and the upper assembly;

the out sole having a base portion generally corresponding with the plantar aspect of a human foot and of varying thickness and having a substantially rectangular opening in a top surface of the base portion thereof adapted for accommodating a metatarsal shank;

the opening for the metatarsal shank centered laterally and extending distally from a location substantially corresponding to the distal 1/3 in a plantar aspect of the metatarsals of the foot to be supported by the medical shoe, and the metatarsal shank accommodated therein is comprised of one of a metallic material and a rigid plastic material;

the out sole having a circumferential counter portion extending upward circumferentially from the top surface of the base portion thereof around the base portion of the out sole thereby providing a cavity in the out sole;

the upper assembly adapted to surround at least the heel, sides and dorsal portions of the human foot, the upper assembly including a heel portion, an intermediate portion and a toe portion, the heel portion and intermediate portion integrally connected, the toe portion comprised of one of an upper toe portion and a closed toe portion, the closed toe portion adapted to surround the metatarsal and phalangeal portions of the human;

the upper assembly attached to the top surface of the base portion of the out sole and the circumferential counter of the out sole, and extending in a dorsal direction from the top surface of the base portion of the out sole along the circumferential counter;

the insole assembly having a plurality of insole layers disposed in the out sole cavity and surrounded by the upper assembly and the out sole circumferential counter;

the plurality of insole layers provided to include a first insole layer, a second insole layer a third insole layer and a fourth insole layer wherein the first and second layers are an Ethyl Vinyl Acetate (EVA) material and the second layer has a durometer less than the first layer, the third layer is a Poron material with a durometer less than the second layer, and the fourth layer is an EVA material with a durometer less than the third layer, and the first, second, third, and fourth layers may be assembled in any order as determined by a health care provider;

the base portion of the out sole having a rocker bottom surface, adapted to permit easy ambulation while also providing a stable platform for standing, the rocker bottom having a flat mid-section in upwardly and rearwardly oblique relation to a tapered heel section and upwardly and forwardly oblique relation to a tapered toe section, the apex of the rocker bottom adapted to form the oblique angle between the mid-section and the tapered toe section and located just below a fitting marker just proximal to the metatarsal heads, the oblique angle between the tapered heel section and the mid-section located just below



mid-heel, the taper of the heel section adapted so as to cause the heel to strike at the oblique angle between the tapered heel section and the mid-section,

the intermediate portion of the upper assembly including inner and outer intermediate flaps adapted to cover the dorsal portion of the human foot, and a first and second strap adapted for using a hook and loop fastening mechanism for interconnecting the inner and outer intermediate flaps, each of the inner and outer flaps including a first and a second ring attached to the respective flap with each first and second ring aligned transversely with one another, and the first and second straps are provided threaded between each of the first and second rings respectively to interconnect the flaps by a pressing and a tension force.

26. A method for using the medical shoe of claim 25, comprising the step of fitting the shoe such that the head of the first metatarsal of the human foot is positioned slightly in front of the fitting marker of the out sole to ensure that the other metatarsal heads of the human foot are just in front of the rocker apex of the rocker bottom of the out sole to reduce a weight-bearing load on the metatarsal heads and forefoot.

27. A method for using the medical shoe of claim 25, comprising the step of treating a non-weight bearing area by removing a portion of the external cover of the upper portion of the shoe surrounding and directly above the area to be treated without removing or damaging the soft inner lining so that the area being treated is protected.

28. A method for using the medical shoe of claim 26, further comprising the step of treating a non-weight bearing area by removing a portion of the external cover of the upper portion of the shoe surrounding and directly above the area to be treated without removing or damaging the soft inner lining so that the area being treated is protected.

29. A method for using the medical shoe of claim 25, comprising the step of treating a weight bearing area by removing an oval area of at least one of the insole layers directly under the area to be treated, wherein the edges of oval area are skived to an angle of approximately  $30^{\circ}$  so that the opening farther away from the area to be treated is slightly larger than the opening nearer the area to be treated, and the upper limit of the oval area is approximately 0.5 cm larger than the area to be treated and extends distally 1.25 cm from the area to be treated.

30. A method for using the medical shoe of claim 26, further comprising the step of treating a weight bearing area by removing an oval area of at least one of the insole layers directly under the area to be treated, wherein the edges of oval area are skived to an angle of approximately  $30^{\circ}$  so that the opening farther away from the area to be treated is slightly larger than the opening nearer the area to be treated, and the upper limit of the oval area is approximately 0.5 cm larger than the area to be treated and extends distally 1.25 cm from the area to be treated.

31. An insole assembly of a healing shoe having an upper assembly, an out sole assembly with a cavity therein, and an out sole circumferential counter, comprising:

a plurality of separably removable insole layers disposed in the out sole cavity;

the separably removable insole layers surrounded by the upper assembly and the out sole circumferential counter integrally attached to the out sole assembly and the upper assembly, the insole assembly adaptable for treating a weight bearing area of a human foot by removing an oval area of at least one of the insole layers directly under the area to be treated;

the plurality of separably removable insole layers provided to include at least one of a plurality of differing insole layer thickness, materials, hardnesses and densities.

32. The insole assembly of claim 31, wherein the edges of the oval area are skived such that the opening farther away from the area to be treated is slightly larger than the opening nearer the area to be treated.

33. A method for using the medical shoe of claim 32, comprising the step of fitting the healing shoe such that a head of a first metatarsal of a human foot is positioned slightly in front of a fitting marker provided on the surface of the out sole assembly to ensure that other metatarsal heads of the human foot are just in front of a rocker apex of a rocker bottom of the out sole assembly to reduce a weight-bearing load on the metatarsal heads and forefoot.

34. A method for using the medical shoe of claim 32, comprising the step of treating the weight bearing area by removing an oval area of at least one of the insole layers directly under the area to be treated, wherein the edges of oval area are skived to an angle of approximately 30° so that the opening farther away from the area to be treated is slightly larger than the opening nearer the area to be treated, and the upper limit of the oval area is approximately 0.5 cm larger than the area to be treated and extends distally 1.25 cm from the area to be treated.

35. A healing shoe for use in supporting a patient's foot comprising:

an out sole;

a circumferential counter portion attached to and extending upward circumferentially from the out sole;

a fitting marker provided on the side surface of the out sole for fitting of the healing shoe to a human foot.

36. The healing shoe of claim 35, wherein the fitting marker is provided on the medial side surface of the out sole approximately  $1/3$  the longitudinal distance between a front surface of a tapered toe section of the shoe and rear surface of a tapered heel section of the shoe corresponding with an apex of a bottom surface of the of the out sole between a flat mid-section of the bottom surface and the tapered toe section in upwardly and forwardly oblique relation the flat mid-section, the fitting marker is provided for longitudinal positioning of a metatarsal-phalangel joint of the human foot within the healing shoe.

37. A method for using the medical shoe of claim 35, comprising the step of fitting the healing shoe such that a head of a first metatarsal of a human foot is positioned slightly in front of the fitting marker provided on the surface of the out sole to ensure that other metatarsal heads of the human foot are just in front of a rocker apex of a rocker bottom of the out sole assembly to reduce a weight-bearing load on the metatarsal heads and a forefoot.

38. A healing shoe having an upper assembly, an out sole assembly with a cavity therein, and an out sole circumferential counter, comprising:

- an insole assembly disposed in the out sole cavity having a plurality of distinct insole layers;

- the insole assembly surrounded by the upper assembly and the out sole circumferential counter integrally attached to the out sole assembly and the upper assembly;

- each of the plurality of insole layers including at least one of a plurality of differing insole layer thickness, materials, hardnesses and densities; and

- a fitting marker provided on the surface of the out sole assembly.

39. A method for using the healing shoe of claim 35, comprising the step of fitting the healing shoe such that a head of a first metatarsal of a human foot is positioned slightly in front of the fitting marker provided on the surface of the out sole assembly to ensure that other metatarsal heads of the human foot are just in front of a rocker apex of a rocker bottom of the out sole assembly to reduce a weight-bearing load on the metatarsal heads and forefoot.

40. A method for using the medical shoe of claim 36, wherein at least one additional insole layer may be added in the vicinity of an area of the human foot to be treated, the at least one additional insole layer having at least one of an insole layer thickness, material, hardness and density different from the plurality of insole layers of the insole assembly.